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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,286	05/04/2006	Steven T. Peake	GB03 0199 US1	1832
65913	7590	10/16/2007		
NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			EXAMINER KIM, SUN M	
			ART UNIT 2813	PAPER NUMBER
			NOTIFICATION DATE 10/16/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

<b>Office Action Summary</b>	Application No. 10/578,286	Applicant(s) PEAKE, STEVEN T.	
	Examiner Sun M. Kim	Art Unit 2813	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/4/06</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This office action is in response to the filing of the instant application.

#### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on May 4, 2006 was filed with the instant application on its mailing date. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1 – 3 and 5 – 7** are rejected under 35 U.S.C. 102(b) as being anticipated by Kato et al. (JP 05-343691).

4. **In re claim 1**, Kato et al. show an insulated gate field effect transistor, comprising (Figure 5):

- a semiconductor body defining opposed first and second major surfaces;
- a drain region 14 and 15 of a first conductivity type extending vertically between the second major surface and part of the first major surface;

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- a body region 11 of a second conductivity type opposite to the first conductivity type extending from the first major surface to a body depth;
- a source region 12 of the first conductivity type adjacent to the body region at the first major surface;
- a source contact S contacting the source region 12 and a drain contact 19 contacting the drain region 14 and 15; and
- an insulated gate 22 extending laterally over the first major surface over the body region 11, defining a channel region extending in the body region 11 from a source end adjacent to the source region 12 to a drain end adjacent to a drain end part of the drain region 15, further comprising:
- a conductive shield plate 21 for shielding the gate 22, extending in an insulated trench 16 from the first major surface towards the second major surface, the conductive shield plate 21 being separated from the body region 11 by part of the drain region 15 including the channel end part of the drain region 15.

5. **In re claim 2**, Kato et al. show a conductive shield plate extension (top horizontal wings making a "T" of element 21) connected to the shield plate 21 extending laterally over the first major surface of the drain region 15 from the shield plate 21 towards the channel end part of the drain region 15, the shield plate extension being separated by insulator 17 from the drain region 15.

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6. **In re claim 3**, Kato et al. show a gate insulator layer 17 extends under both the gate 22 and the shield plate extension (top horizontal wings making a "T" of element 21).
7. **In re claim 5**, Kato et al. show the shield plate 21 is connected to the source 12.
8. **In re claim 6**, Kato et al. show the depth of the shield plate trench 16 is between about 50% and about 200% of the depth of the body region 11.
9. **In re claim 7**, Kato et al. show wherein the first conductivity type is n-type (elements 12, 15, and 14), the second conductivity type is p-type (element 11), and the shield plate 21 is of p-type doped poly-silicon.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 4 and 8 – 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. as cited above.
12. **In re claim 4**, Kato et al. show a lateral gap between shield plate extension (top of 21) and gate 22. They do not disclose the size of the lateral gap, however, it would have been obvious to one having ordinary skill in the art at the time of the invention to make the gap in the range of about 0.05 to about 0.2 microns since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the

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optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233, 1955).

13. **In re claim 8**, Kato et al. show a lateral gap between the shield plate trench (top of element 21) and the body region 11. They do not disclose the size of this lateral gap, however, it would have been obvious to one having ordinary skill in the art at the time of the invention to make the lateral gap between about 0.5 and about 2 microns since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233, 1955).

14. **In re claim 9**, Kato et al. show that the gate 22 extends over the channel end part of the drift region (top portion of element 15). They do not disclose by how much the gate 22 extends of the channel end part of the drift region, however, it would have been obvious to one having ordinary skill in the art at the time of the invention to make the gate extend over the drift region by no more than about 0.4 microns since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233, 1955).

### **Conclusion**

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Disney (US Patent 6,468,847) also have a trench plate paired with a insulated gate (Figure 5). Werner et al. (DE 100 07 415 A 1) and Ono et al. (US

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PGPub 2003/0227052) as cited by Applicant as cited by Applicant show the doping regions as claimed and a trench plate paired with insulated gates. Holm-Kennedy (US Patent 5,466,348) shows a trench gate paired with a lateral gate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sun M. Kim whose telephone number is (571) 270-1431. The examiner can normally be reached on Monday - Thursday 10:30 am - 8:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SMK 10/1/07

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800